

Appl. No. 10/042,626  
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Reply to Office action of Aug.17, 2004

**Amendments to the Drawings:**

The attached sheets of drawings includes the addition of "Replacement Drawings" on the top page of each drawing.

Attachment: Replacement Sheets  
Annotated Sheets Showing Changes

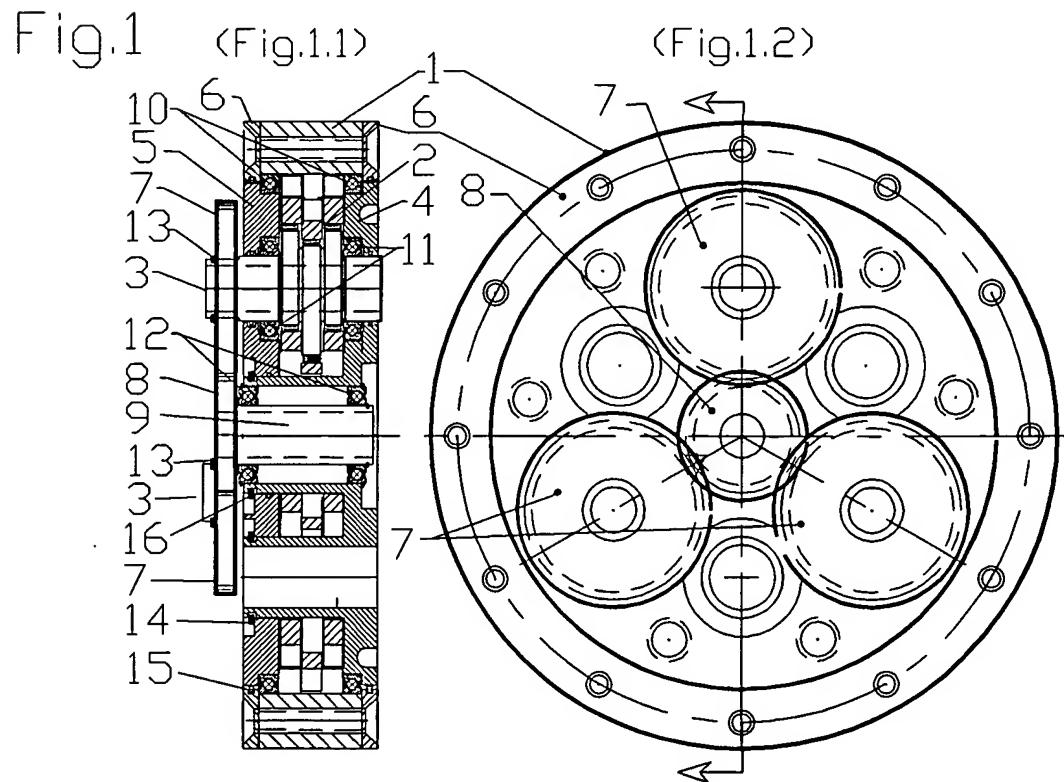


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Table 1 (Parts Name to Fig.1)

- 1 CYCLO ID-GEAR HOUSING
- 2 CYCLO OD-GEAR DISK
- 3 ECCENTRIC 0+120+240deg. HOLLOW SHAFT
- 4 DRIVE-THROUGH HOLLOW FLANGE
- 5 CONTAINING FLANGE
- 6 BEARING RETAINER
- 7 PLANET GEARS
- 8 PLANET SUN GEAR
- 9 SUN GEAR HOLLOW AXIS
- 10 BEARING CYCLO AXIS
- 11 ECCENTRIC BEARING
- 12 BEARING SUN GEAR SHAFT
- 13 SNAP RING PLANET GEAR
- 14 SNAP RING FLANGE
- 15 SEAL X-TYPE
- 16 SNAP RING CENTER OF HOUSING

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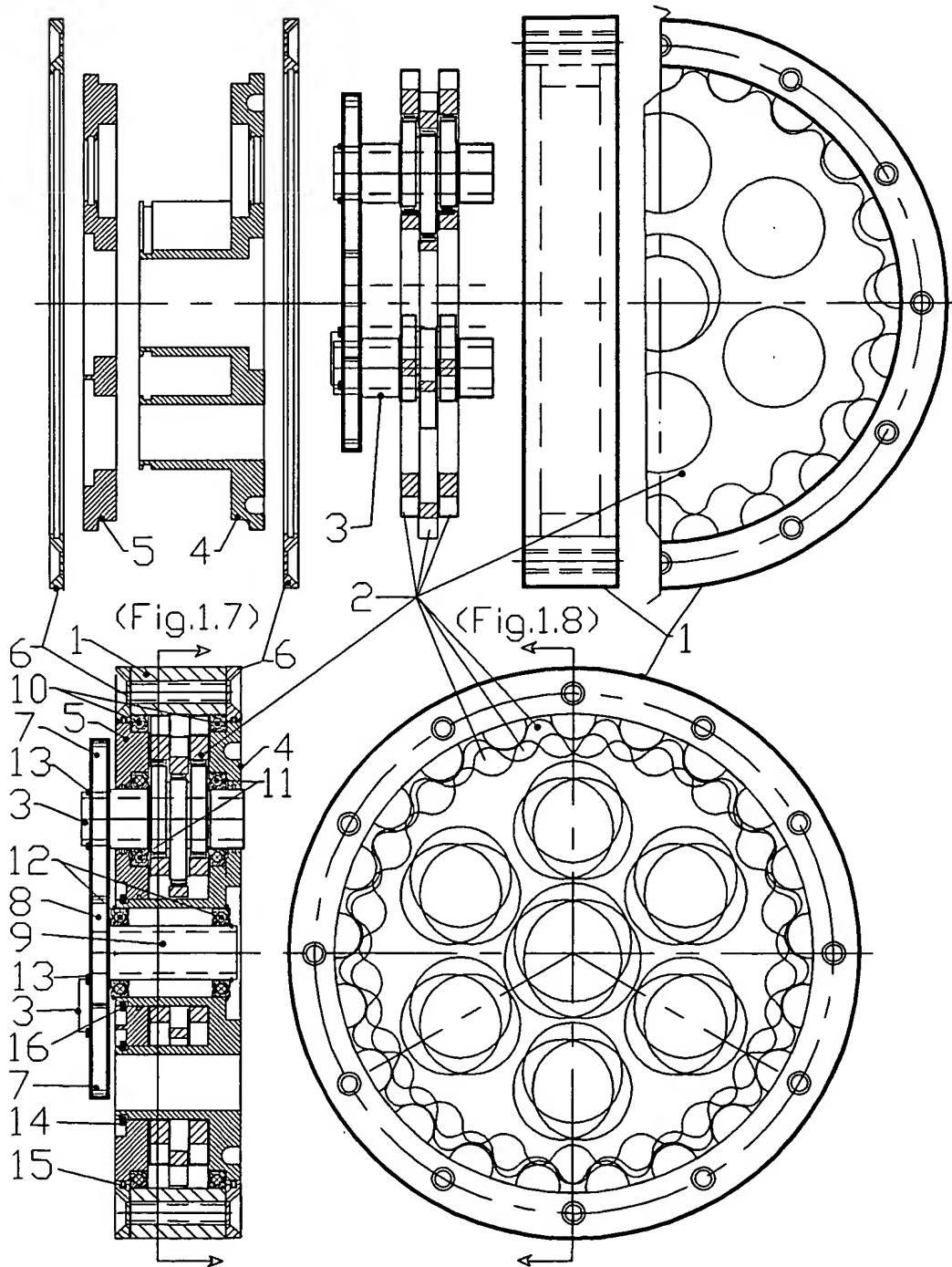
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(Fig.1.3)

(Fig.1.4)

(Fig.1.5)

(Fig.1.6)



1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
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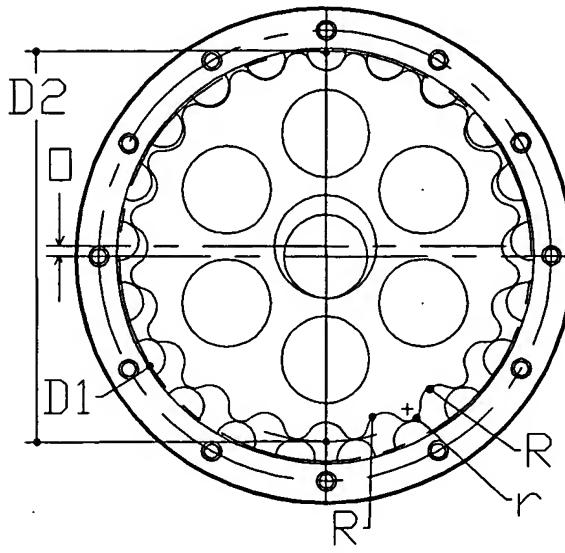
Table 2 (Cyclo Gear Relations and Symbols)

$R$  = radius of cyclo tooth  
 $r$  =  $r$  of Arc  $\text{Tan}(R, D_1, 2, R)$   
 $D$  = diameter at tooth centers  
 $\square$  = offset of eccentrics  
 $Z_1$  = number of cyclo gear teeth  
 $Z_2$  = number of cyclo disk teeth

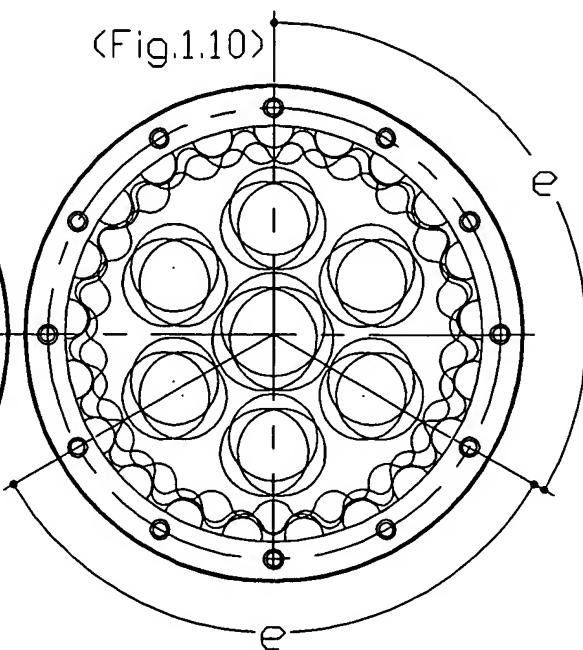
Relations:

$$\begin{aligned}
 Z_2 &= Z_1 - 1 \\
 D_1 &= Z_1 \times R \\
 D_2 &= Z_2 \times R \\
 \square &= R/2 \\
 U_{\text{cyclo}} &= R_2/R_1 - 1 \\
 U_{\text{total}} &= (Z_{\text{sun}} / Z_{\text{planet}}) (U_{\text{cycle}}) \\
 e &= \text{Ecc. Index} = 360\text{deg} / \text{No of Cyclo Disks}
 \end{aligned}$$

(Fig.1.9)



(Fig.1.10)





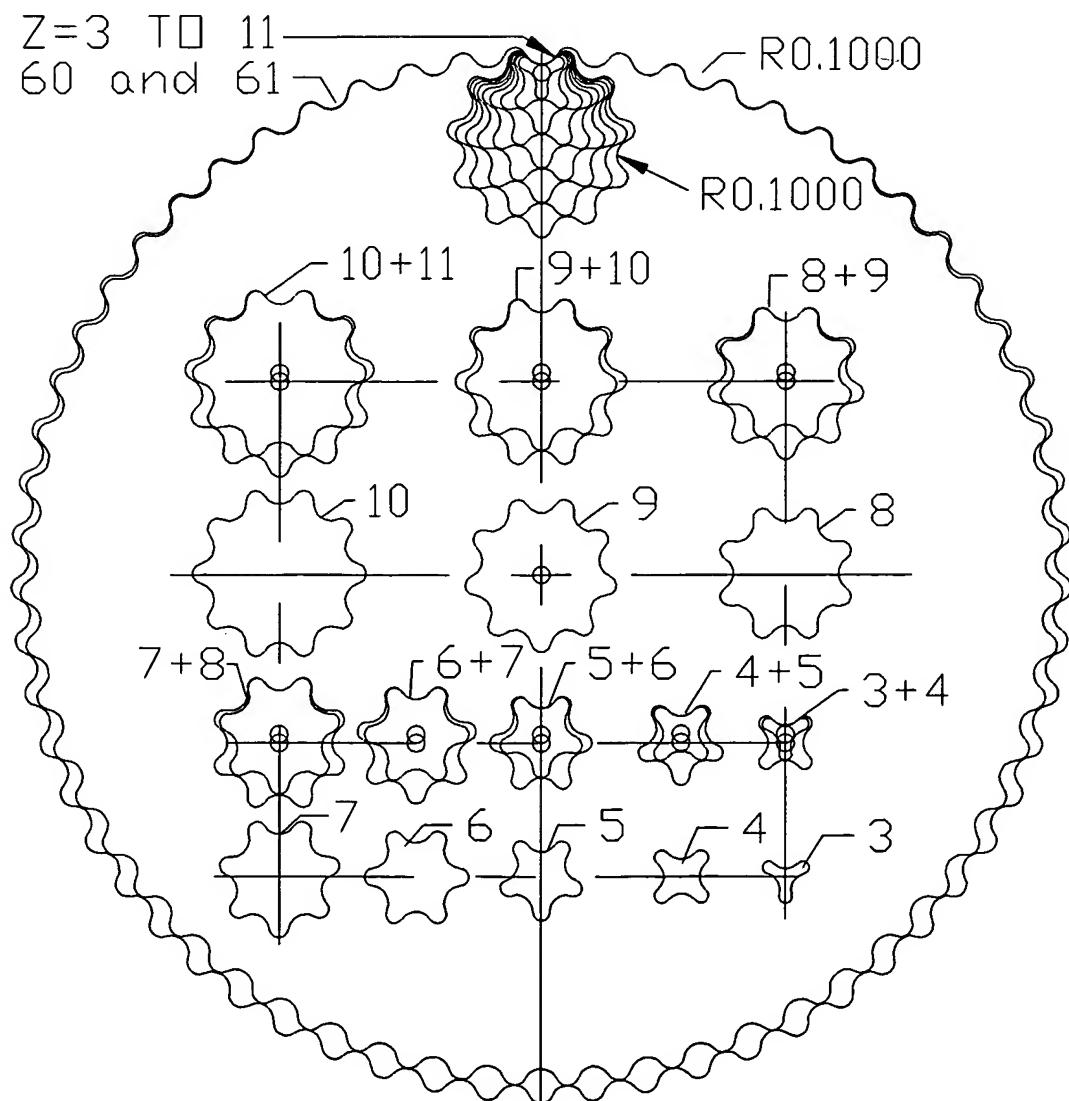
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TABLE 3

Sample Cyclo Gear Relations from  
3 to 11 and 60 and 61 Cycle Teeth

(Fig. 1.11)





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Fig. 2

Center-Driven Cyclo Gear Axes with one (Fig.2.1), two (Fig.2.2), three (Fig. 2.3) Center-Driven Wave Disks, six hollow Driveout Pints and Bushings.

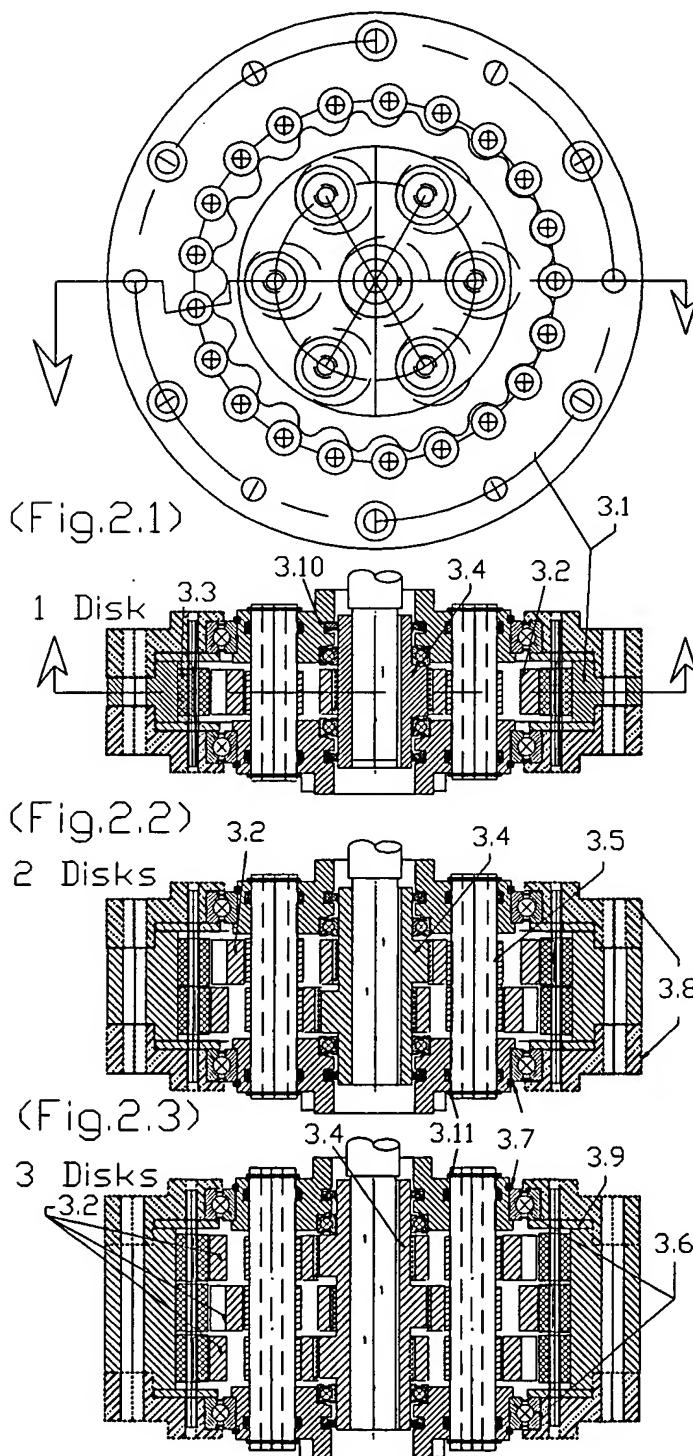


TABLE 4  
 To Fig.2 Part  
 Names

- 3.1 Cyclo Gear
- 3.2 Cyclo Disk(s)
- 3.3 Cyclo Rollers
- 3.4 Eccentric(s)
- 3.5 Hollow Pins
- 3.6 Bearing Flg.
- 3.7 Snap Ring
- 3.8 End Covers
- 3.9 Stop Rings
- 3.10 Shaft Seal
- 3.11 Snap Ring



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Fig. 3

FREQUENCY SHIFT AND SERVO  
FILTER TO CONTROL CRITICAL  
FREQUENCY VIBRATION

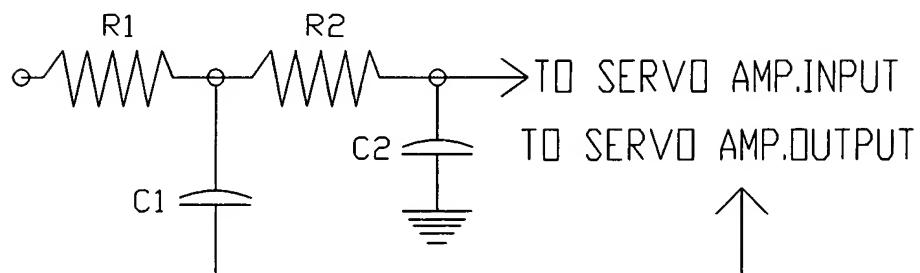
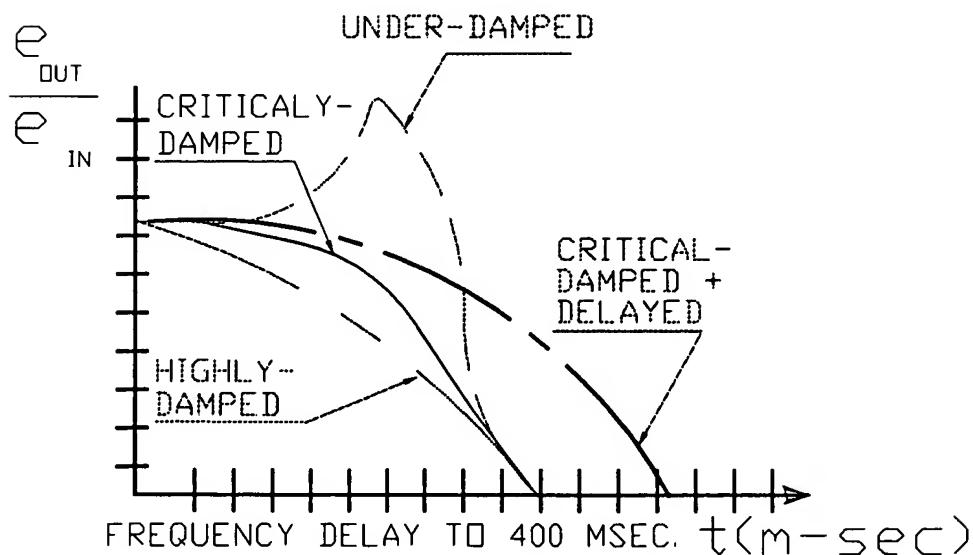
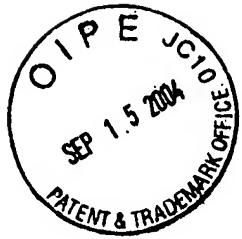


Fig. 4





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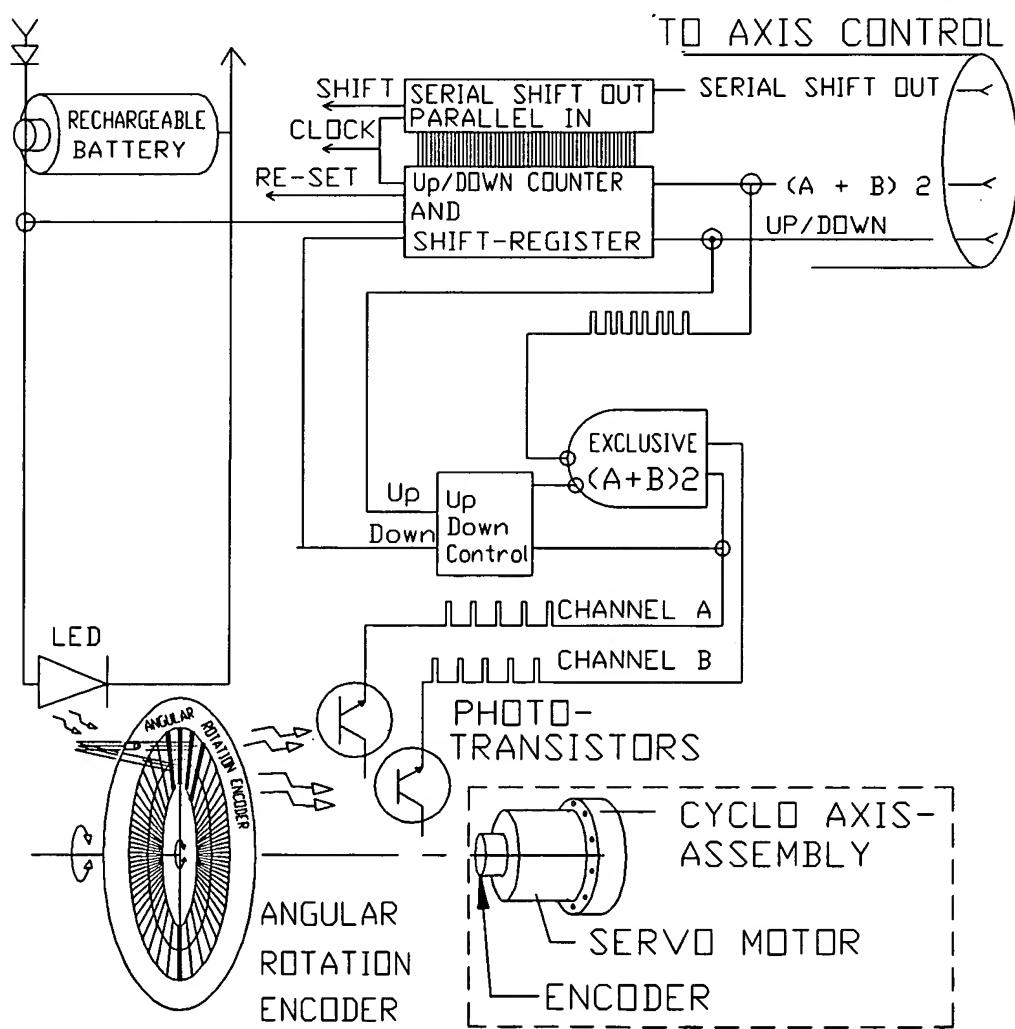
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Fig. 5

ONE DISK ABSOLUTE ANGULAR ROTATION ENCODER USING LOW-POWER INFRARED LED, TTL UP/DOWN COUNTER WITH SHIFT REGISTER AND LOCAL RECHARGEABLE BATTERY POWER BACKUP



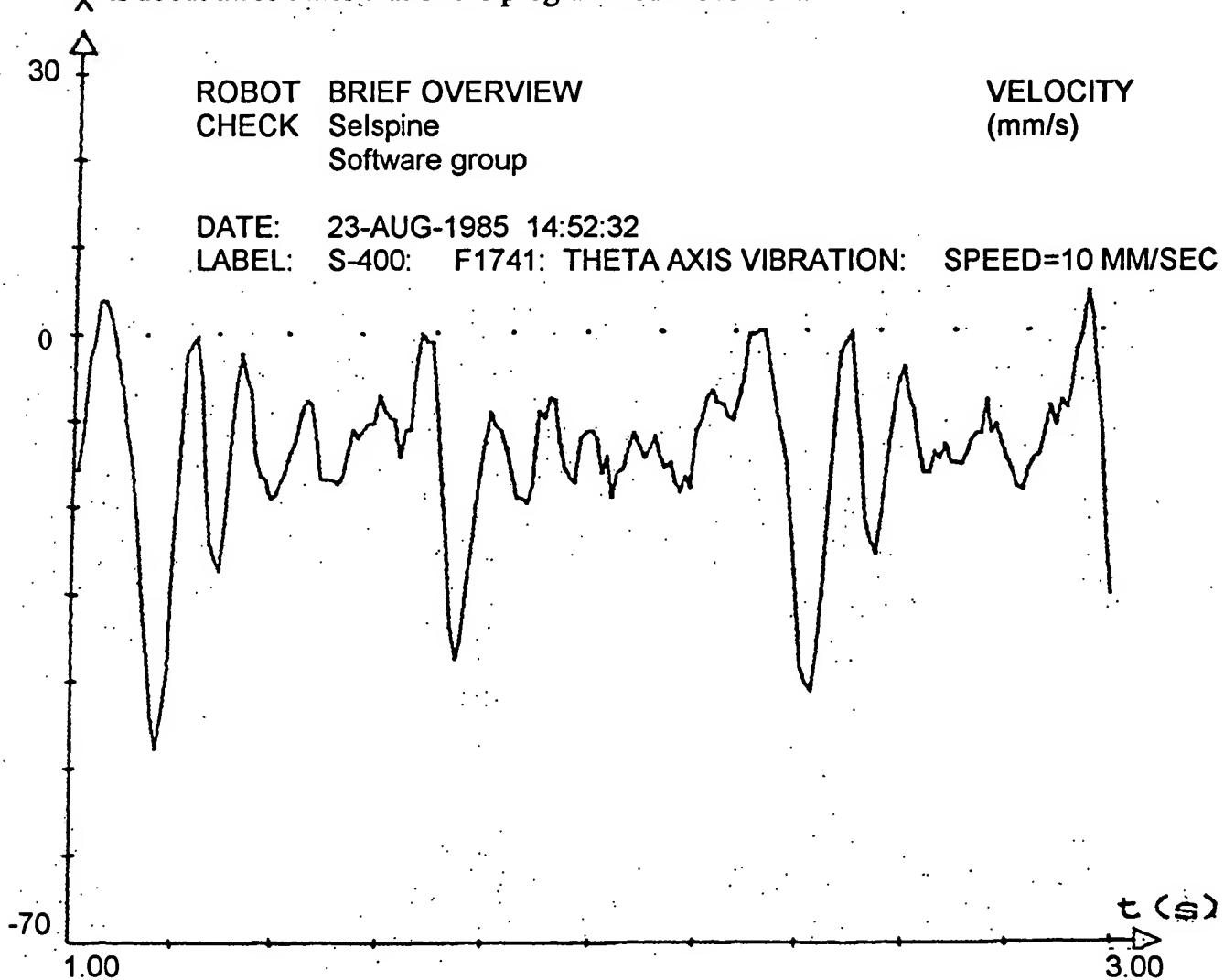
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**Chart 1 of Cyclo Patent for Otto Regner**

The chart below shows the true S-400 Serial # F1741 Fanuc (GMF-Robot) end-effector movements. The robot was equipped with cyclo torque multipliers. The base or Theta Axis was moving.

The measured movement was 2 seconds between start and stop. The vibration amplitude shown is -48 mm/sec to 5 mm/sec and basic 1.6 hertz and imposed multiple of 8 hertz at a constant programmed velocity of -10 mm/sec. The vibration movement in the X-plan is about three times that of the programmed movement.



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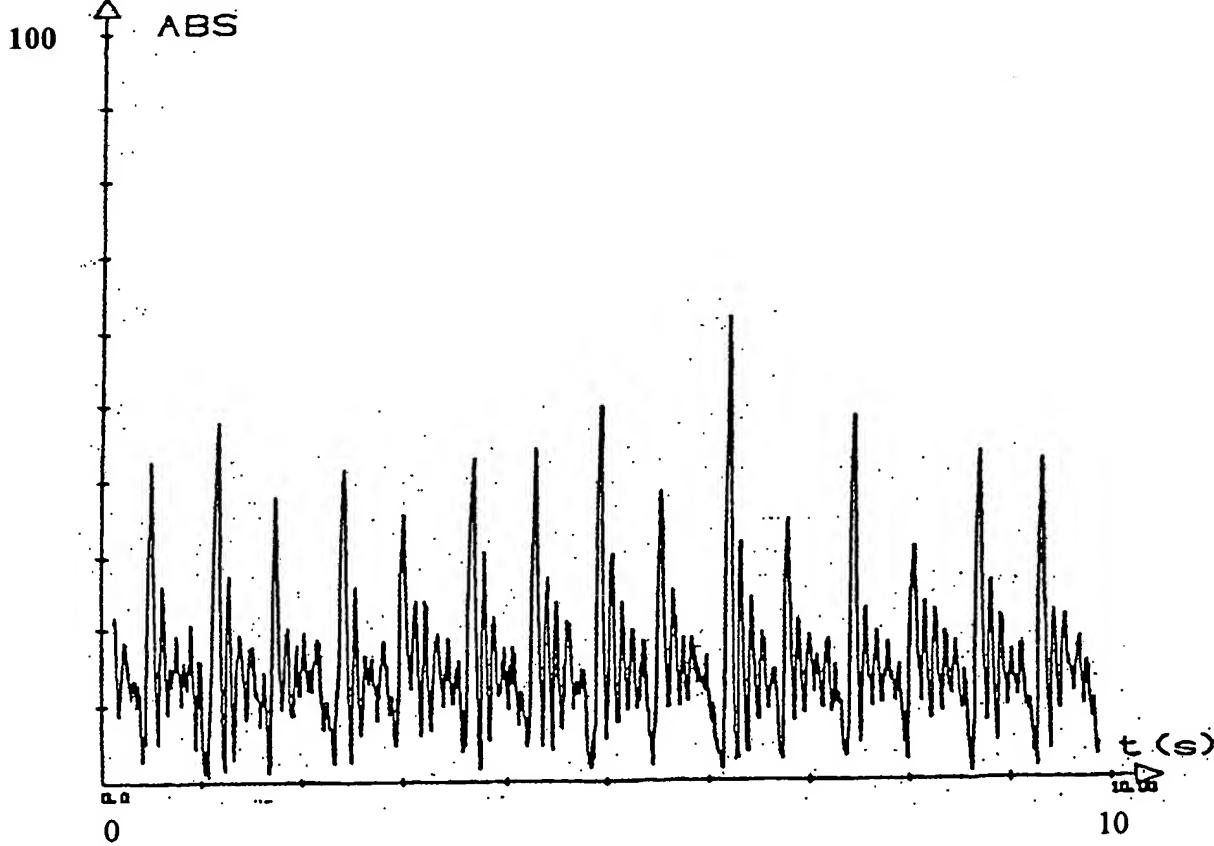
## Chart 2 of Cyclo Patent for Otto Regner

The chart below is from the S-400 Serial # F1741 Fanuc (GMF-Robotics) end-effector movements. The robot's gears are cyclo torque multipliers and the Theta Axis was only programmed to move for charting.

The programmed time was over 20 seconds at a 10mm/second speed. The ABS vector was charted 5 seconds after start and for 10 seconds.

The produced chart tells us: there are 16 ABS (absolute) velocity changes larger than 30 mm/sec; the largest is 62 mm/second. The majority of 65+ velocity changes are in the range of 20 mm/sec. The main vibration frequency is 1.6 hertz and the secondary multiple of frequencies is 8 hertz. The critical base frequency is therefore 1.6 hertz with an "N" resonance factor of 5;  $5 \times 1.6 = 8$  hertz, absolute.

ROBOT CHECK	BRIEF OVERVIEW	VELOCITY (mm/sec)
	Seapine Software group	PAGE:
DATE: 23-AUG-1985 14:52:32		
LABEL: S-400, F1741, THETA AXIS VIBRATION, SPEED=10 MM/SEC		



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with accessible shift register/memory is added is continuously powered to make it an  
absolute position smart axis as shown in on FIG. 5.

Claim 16 (currently amended): A geometrical design arrangement for planet type roller gears according to claim 15: wherein the analog summing circuits and feedback servo circuit ~~often~~ may feeds back data misdirecting the summing results and ~~therefor~~ the servo action. The ~~FIG. 7~~ Figure 3 frequency and servo filter counteracts ~~irrelevant~~ extraneous signals and enhances further the productivity and performance of the cyclo torque multiplier and cyclo gear axis as shown in Figure 4.